Lecture Module - To Err is Human

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering

Tennessee Technological University

Topic 1 - Accuracy and Error

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- Thought Experiment
- Accuracy and Error
- Estimating Error
- Uncertainty Interval

Thought Experiment

Thought Experiment: Look around the room and choose an object. It can be anything. Ask yourself the following questions.

- What is the **true** length of the object?
- How can you find the **true** value? Can you measure it?
- ...

Image: T.Hill

Accuracy and Error

The exact value of a variable is called the _____ _____. The value of the variables as indicated by a measurement system is called the _____ _____. The _____of a measurement refers to the closeness of agreement between the measured value and the true value. But the _____ _____is rarely known _____, and various influences, called _____, have an effect on both of these values. So the concept of the _____of a measurement is a _____one.

Text: Theory and Design of Mech. Meas.

Estimating Error

The _____ _____can be estimated but cannot be known _____. In practice a _____value is used in place of the true value. We will discuss this again the the *Calibration Module*.

An estimate of error based using this value is sometimes referred to as _____ _____.

Uncertainty Interval

"The _____is a numerical estimate of the possible range of the error in a measurement. In any measurement, the _____is not known exactly since the true value is rarely known exactly. But based on available information, the operator might feel confident that the error is within certain bounds, a plus or minus range of the indicated reading. This is the assigned _____."

We will discuss this again the the *Uncertainty Module*.

Text: Theory and Design of Mech. Meas.